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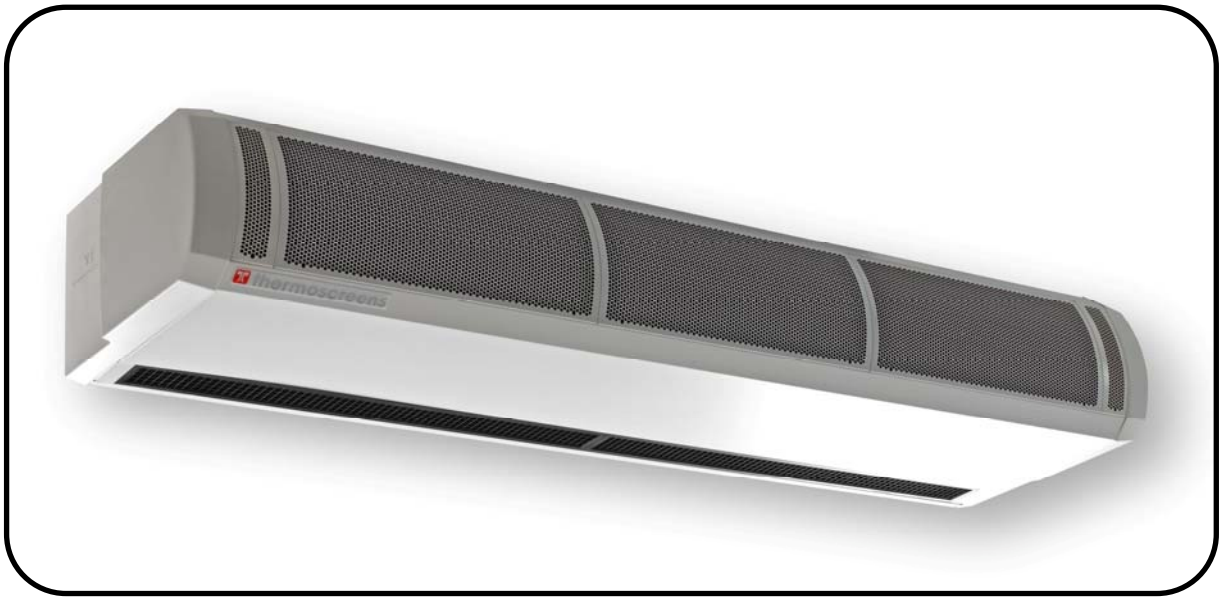
thermoscreens®

HP HEAT PUMP RANGE AIR CURTAINS

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS



For use with Mr Slim Outdoor Units

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING INSTALLATION

MITSUBISHI ELECTRIC
AIR CONDITIONING SYSTEMS

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English

Thermoscreens / Mitsubishi Electric

Mr Slim HP Heat Pump Air Curtain System

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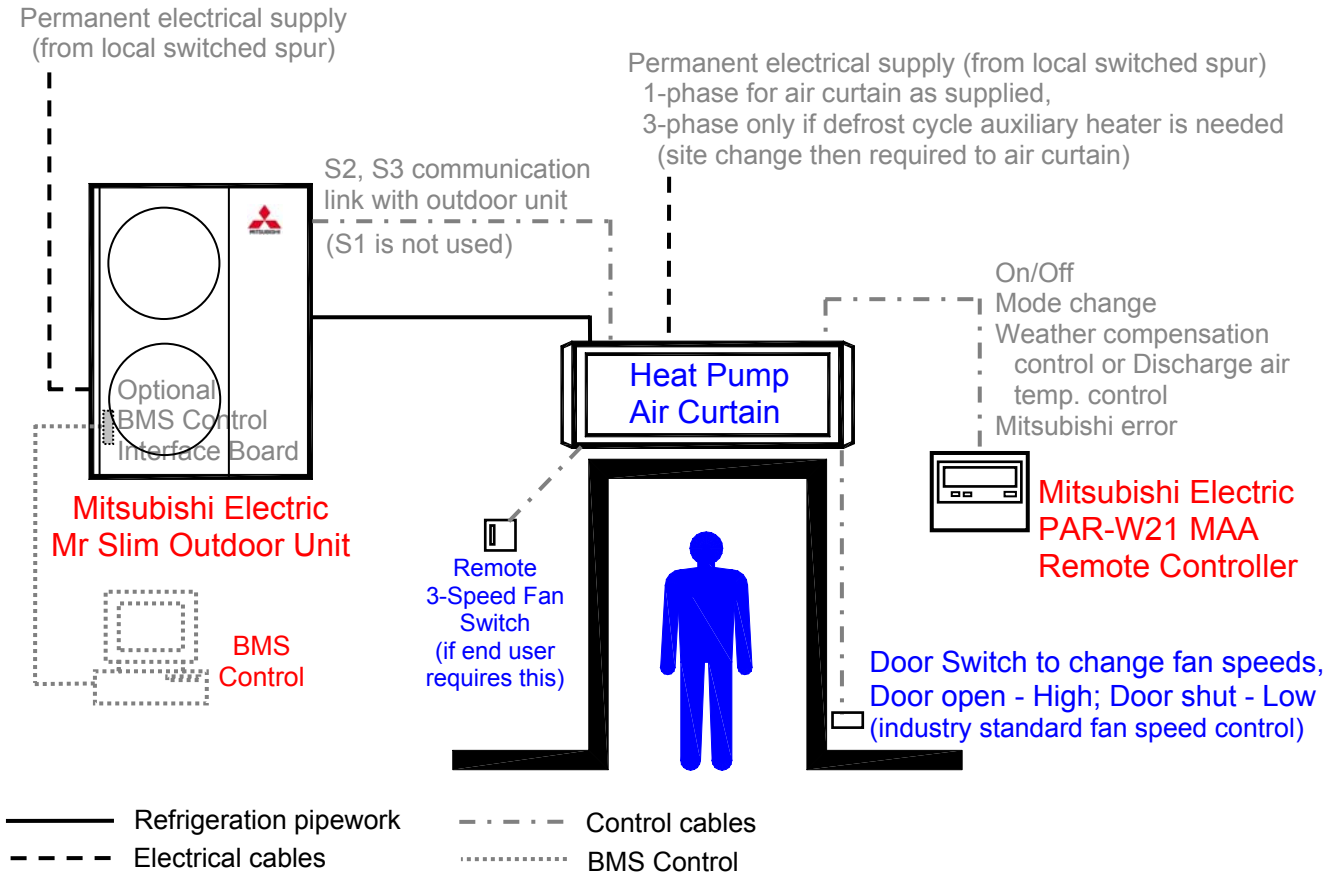
Mr Slim HP Heat Pump Air Curtain System
with Weather Compensation Control
or Discharge Air Temperature Control)

Air Curtain is supplied set-up to operate on either of these control modes



The Mr Slim HP Heat Pump Air Curtain System consists of :-

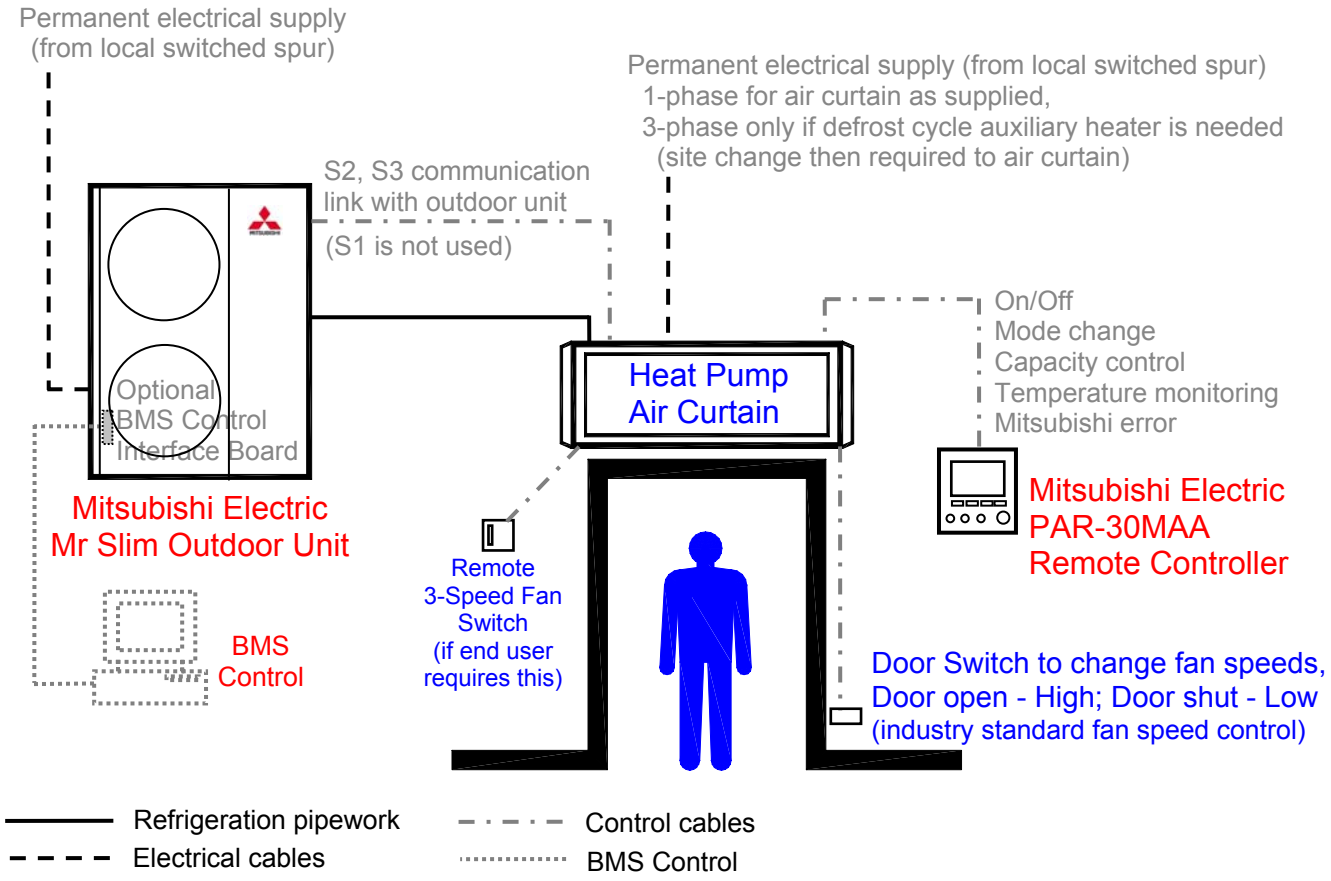
- a Thermoscreens 'HP Air Curtain' fitted with a Mitsubishi Electric PAC-IF010B-E Interface PCB, with dip switches set to be a PAC-IF020B-E *
- a Mitsubishi Electric 'Mr Slim Outdoor Unit' +
- a Mitsubishi Electric 'PAR-W21 MAA Remote Controller' for manual control by the occupant of weather compensation control or discharge air temperature control +
- a door switch to change fan speeds; higher speed when the door is open, lower speed when the door is shut ^
- a Thermoscreens 'Remote 3-Speed Fan Switch' (if end user requires this) *

* - *supplied by Thermoscreens Ltd.*
\+ - *Mitsubishi Electric items supplied by the installer*
^ - *supplied by the installer*

Thermoscreens / Mitsubishi Electric

Mr Slim HP Heat Pump Air Curtain System
with Inlet Air Temperature Control
or Room Air Temperature Control

Air Curtain is modified during commissioning to operate on these control modes



The Mr Slim HP Heat Pump Air Curtain System consists of :-

- a Thermoscreens 'HP Air Curtain' fitted with a Mitsubishi Electric PAC-IF010B-E Interface PCB *
- a Mitsubishi Electric 'Mr Slim Outdoor Unit' +
- a Mitsubishi Electric 'PAR-30MAA Remote Controller' for manual control by the occupant of inlet air temperature control or room air temperature control +
- a door switch to change fan speeds; higher speed when the door is open, lower speed when the door is shut ^
- a Thermoscreens 'Remote 3-Speed Fan Switch' (if end user requires this) *

* - *supplied by Thermoscreens Ltd.*
\+ - *Mitsubishi Electric items supplied by the installer*
^ - *supplied by the installer*

DESIGN INFORMATION

AS SUPPLIED the air curtain operates on a 1 phase electrical supply (1L+N+E) from a local switched spur which provides power for fans and controls. There is an integral defrost cycle auxiliary heater located inside the air curtain but this is 'disabled' as supplied. If the defrost cycle auxiliary heater is required the air curtain will then need a 3 phase electrical supply (3L+N+E) from a local switched spur, instead of the 1 phase electrical supply, to provide power for the heater as well which will need to be 'enabled' on site during commissioning, see also notes on Page 6 and Section 'Installation - Electrical Supply and Wiring to the Air Curtain', Page 14. There is also a communications link with the Mr Slim outdoor unit via connections S2 and S3 (S1 is not used).

AS SUPPLIED the air curtain is set up for energy saving **Weather Compensation Control** or **Discharge Air Temperature Control** and is used with a Mitsubishi Electric PAR-W21 MAA Remote Controller. The following functions are available:-

- On/Off control of the Mitsubishi Electric heat pump system
- Mode change between Heating mode and Fan only mode (Cooling mode not available)
- Energy saving weather compensation control or discharge air temperature control via a set target temperature.
- Signal for when the outdoor unit is in defrost mode so the defrost cycle auxiliary heater (if enabled) can provide partial heat back-up during the few minutes of defrost.
- Error signal for if the Mitsubishi Electric heat pump system has a problem

Weather Compensation Control (HEATING ECO): This looks at the outside air temperature using an air sensor on the Mitsubishi Electric outdoor unit and automatically adjusts the temperature of the air curtain discharge air in accordance with a heating curve. It will select a warmer discharge air stream if it is cold outside and a cooler discharge air stream if it is not so cold outside, as the discharge air does not need to be as warm. This achieves significant energy and carbon savings because the heat pump compressor only works at the capacity it needs to. Figure 1 shows a typical heating curve set up for weather compensation control, temperature points 1, 2, 3 and 4 are selected during commissioning.

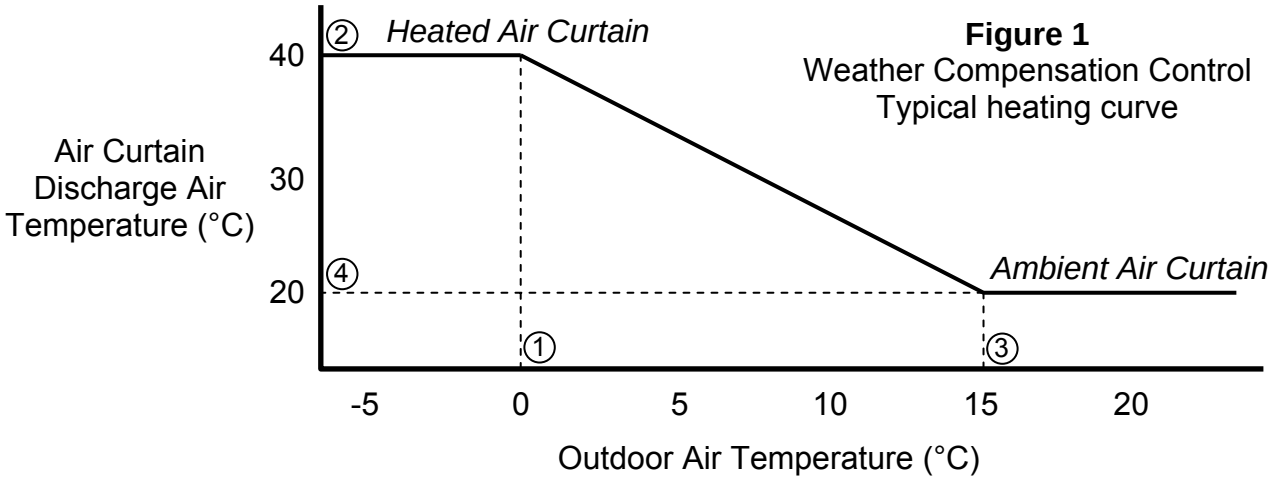


Figure 1
Weather Compensation Control
Typical heating curve

Discharge Air Temperature Control (HEATING): The end user sets a target temperature of, say 35°C, the air curtain then controls the temperature of the discharge air so it will stay at 35°C even if the inlet air temperature changes.

The air curtain can also be set up on site during commissioning to operate under **Inlet Air Temperature Control** or **Room Air Temperature Control** and is then used with a Mitsubishi Electric PAR-30 MAA Remote Controller. The following functions are available:-

- On/Off control of the Mitsubishi Electric heat pump system
- Mode change between Heating mode and Fan only mode, with Cooling mode also available if enabled during commissioning and with a condensate disposal system
- Capacity control of the Mitsubishi Electric heat pump system
- Temperature monitoring of the inlet air entering the heat pump air curtain, or the room air temperature at the remote controller
- Signal for when the outdoor unit is in defrost mode so the defrost cycle auxiliary heater (if enabled) can provide partial heat back-up during the few minutes of defrost.
- Error signal for if the Mitsubishi Electric heat pump system has a problem

Refer to a Mitsubishi Electric agent if the air curtain is to be controlled via a Building Management System (BMS) or Centralised Controller.

It should be noted that during heating mode, if the outdoor unit goes into its defrost cycle during cold weather, the air curtain fans will continue to operate to maintain the all-important air stream across the doorway. It is this air stream, particularly towards the top of the doorway, which is so effective at stopping buoyant warm air from inside the building escaping to outside and wasting energy and also in reducing airborne contamination.

The temperature of the discharge air can be low during the 6 to 7 minute defrost cycle period that may occur every few hours under particular outdoor weather conditions but this has rarely become an issue with the end user and is really only a perceived problem. There is a defrost cycle auxiliary heater fitted in the air curtain which is disabled when the air curtain is delivered. If there are concerns for a particular installation this defrost cycle auxiliary heater can be enabled during site commissioning and this will maintain the discharge air at a higher temperature during the defrost cycle. A 3-phase electrical supply is then required to power the air curtain.

Point of Information: If used, an auxiliary defrost heater may seem counter-productive for a heat pump system. When put into context, however, the auxiliary heater fitted is of low output for the size of the air curtain, it will just temper the discharge air and is only used for a few minutes a day during a small period of the year. Tests at the Building Research Establishment (BRE) test house on the heat pump air curtain system showed that even with the auxiliary heater cutting in during defrost, as it has to during their EN14511 performance test, the annual seasonal COP was hardly affected.

Cooling is possible if the air curtain is modified during commissioning to operate under **Inlet Air Temperature Control** or **Room Air Temperature Control**. It will not operate in cooling if set-up to operate under **Weather Compensation Control** or **Discharge Air Temperature Control**, which is how the air curtain is supplied.

The air curtain is supplied with its cooling mode disabled, although an integral condensate drain tray is fitted inside the air curtain so it could be used in cooling mode during warm weather, if so desired. This should be decided at the design stage as a condensate drain system will need to be installed if cooling is required and extended to a suitable drain by the installer. The condensate can be drained by gravity by connecting suitable condensate hose onto the 15mm drain pipe on the condensate drain tray inside the air curtain. If a gravity condensate drain is not visually suitable it will be necessary to remove condensate using a condensate pump, supplied and fitted by the installer. The condensate pump can

be located inside the right hand end of the air curtain or in a remote location outside of the unit if required. It must be of sufficient capacity, see Page 19, self priming and capable of providing the appropriate suction head so the pump will lift condensate out of the air curtain, particularly if it is in a remote location. There are two hole penetrations at the right hand end of the air curtain for condensate pipework to pass through, see Figure 2, Page 11. Suitable condensate pumps are Peristaltic or Rotary Diaphragm type. We recommend the Blue Diamond rotary diaphragm type with cooling signal sensor (drainStik) manufactured by Charles Austen Pumps Ltd. (www.miniblue.co.uk).

If using a condensate pump it is recommended that it has the facility so it only operates when the air curtain is in cooling mode by detection of water in the drain tray or by detecting a cooling differential in the airflow. It should also have a pump overrun feature to empty the drain tray as much as possible when the air curtain is switched off. It should have an alarm system with appropriate sensor fitted in the drain tray that will give a volt-free signal (closed circuit = alarm) and stop the air curtain cooling if the condensate drain tray is in danger of flooding (air curtain fans will continue to operate). There is a fixing bracket with 8mm diameter hole attached to the drain tray inside the air curtain so a condensate sensor can be fixed in the tray by the installer. The hole can be enlarged, if necessary, to suit the type of sensor used so it is located in the tray at the appropriate position, see the manufacturer's instructions that come with the condensate pump for further information. A 230V AC, single phase electrical supply is provided inside the air curtain to power a condensate pump and a condensate alarm connection is provided for the condensate pump alarm circuit.

Warning: The air curtain condensate collection system is designed to remove condensate with the air curtain operating in cooling mode during normal summer weather conditions in countries with a temperate climate. In case of extreme weather conditions, drain tray blockage or condensate pump failure, which can occur, it is vital that the design of the floor beneath the air curtain and its surface is such that it will not become slippery or damaged if it became wet. This is similar to the conditions that might be experienced with heavy rainfall in at an open doorway or wet pedestrian foot traffic, so careful consideration must be paid to the design of the floor and its surface finish.

If it is intended that the air curtain should not operate in cooling mode (which is how the air curtain is supplied) and a condensate drain system is not fitted, it is still recommended that the floor design and surface be as described above, in case cooling mode is used in the future and also to cope with heavy rainfall or wet pedestrian foot traffic.

The air curtain is designed only for use with a Mitsubishi Electric Mr Slim Outdoor Unit for use on R410A. The complete Thermoscreens air curtain / Mitsubishi Electric heat pump system, including refrigerant pipework, wiring, controls, etc. must be installed only by an approved Mitsubishi Electric refrigeration contractor.

Persons using the air curtain must be given adequate instruction and supervision concerning the use of the appliance by a person responsible for their safety. The air curtain is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities.

These instructions must be read in conjunction with the separate Mitsubishi Electric instructions that come with the Mr Slim Outdoor Unit. All instructions should be kept by the building facilities manager for future reference.

UNPACKING THE AIR CURTAIN

The following items are supplied and packaged within the air curtain box :-

HP Heat Pump Air Curtain

Please note, plastic end caps are supplied loose to be fitted during installation

Wall Brackets and Fixing Bolts

for if air curtain is to be wall mounted

Remote 3-Speed Fan Switch

If remote fan speed control is required by the end user
NB Industry standard is to have High/Low fan speed control via a door switch or single speed set at commissioning

If anything is missing or damaged please contact your place of purchase immediately.

There will also be a 'Mr Slim Outdoor Unit' and ‘Remote Controller’ (if required) supplied by Mitsubishi Electric.

The Installer will also need to supply and install the following:-

PAR-W21 MAA Remote Controller

If Air Curtain is to be manually controlled for weather compensation control or discharge air temp. control, also needed for commissioning

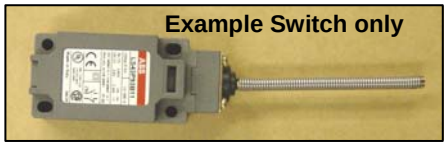
or

PAR-30 MAA Remote Controller

If Air Curtain is to be manually controlled for inlet air or room air temperature control, also needed for commissioning

The installer may also need to supply and install the following optional items:-

Door Switch – for energy efficient, noise friendly, fan speed control,
Door open – Higher fan speed
Door shut – Lower fan speed



Gives industry standard fan speed control – see wiring diagrams on Pages 16 & 17 and text on Pages 18 & 22 for more information

Condensate Pump – self priming with cooling mode detection, alarm system and pump overrun

If Air Curtain is to be operated in COOL mode and gravity drain cannot be used – see text on Page 6 & 7 for more information

The complete Thermoscreens air curtain / Mitsubishi Electric heat pump system, to provide a heat pump air curtain over a doorway, including wiring, fridge pipework, etc. is to be installed only by an approved Mitsubishi Electric refrigeration contractor.

IMPORTANT

This Heat Pump Air Curtain is intended only for use with a Mitsubishi Electric Mr Slim Outdoor Unit, for use on R410A.

These instructions must be read in conjunction with the Mitsubishi Electric Mr Slim Outdoor Unit instructions.

(All documentation supplied with each unit should be stored and kept for future reference.)

For your records:

Date of Purchase……..

Place of Purchase…….

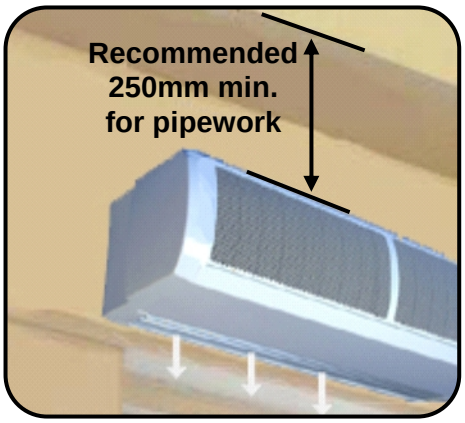
Serial Number……

For warranty purposes proof of purchase is necessary so please keep a copy of your invoice.

INSTALLATION OF THE AIR CURTAIN

The air curtain is designed to be surface mounted inside a building and located horizontally over a doorway. It must not be installed on the outside of the building, or built into a cabinet or recessed in anyway.

Location



The air curtain must be mounted so the discharge grille is located up to 3.2m maximum above floor level and as close to the doorway as possible. It must be installed level or condensate may leak out if used for cooling. It is recommended to leave a gap of 250mm minimum above the air curtain to allow for pipework brazing operations. Beware of doorway top edges, structural beams, door opening/closure devices, etc. which may interfere with the air stream and affect the location of the unit.

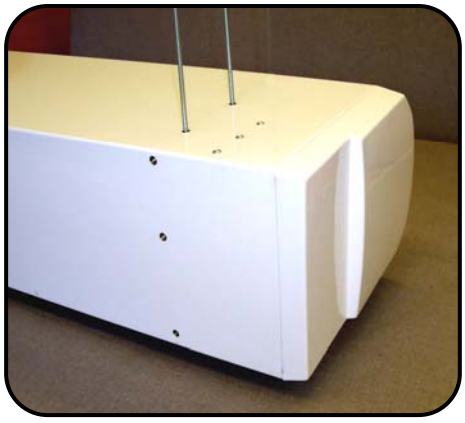
Wall Fixing

Bolt all of the wall brackets supplied to the rear face of the unit as shown in the adjacent picture using the M10 bolts supplied. Suitable wall fixing bolts (not supplied) need to be used to fix the brackets to the wall, taking into account the type of wall and the weight of the unit*, see table:

Air Curtain	Weight (kg)
HP1000 DXE	46
HP1500 DXE	67
HP2000 DXE	84

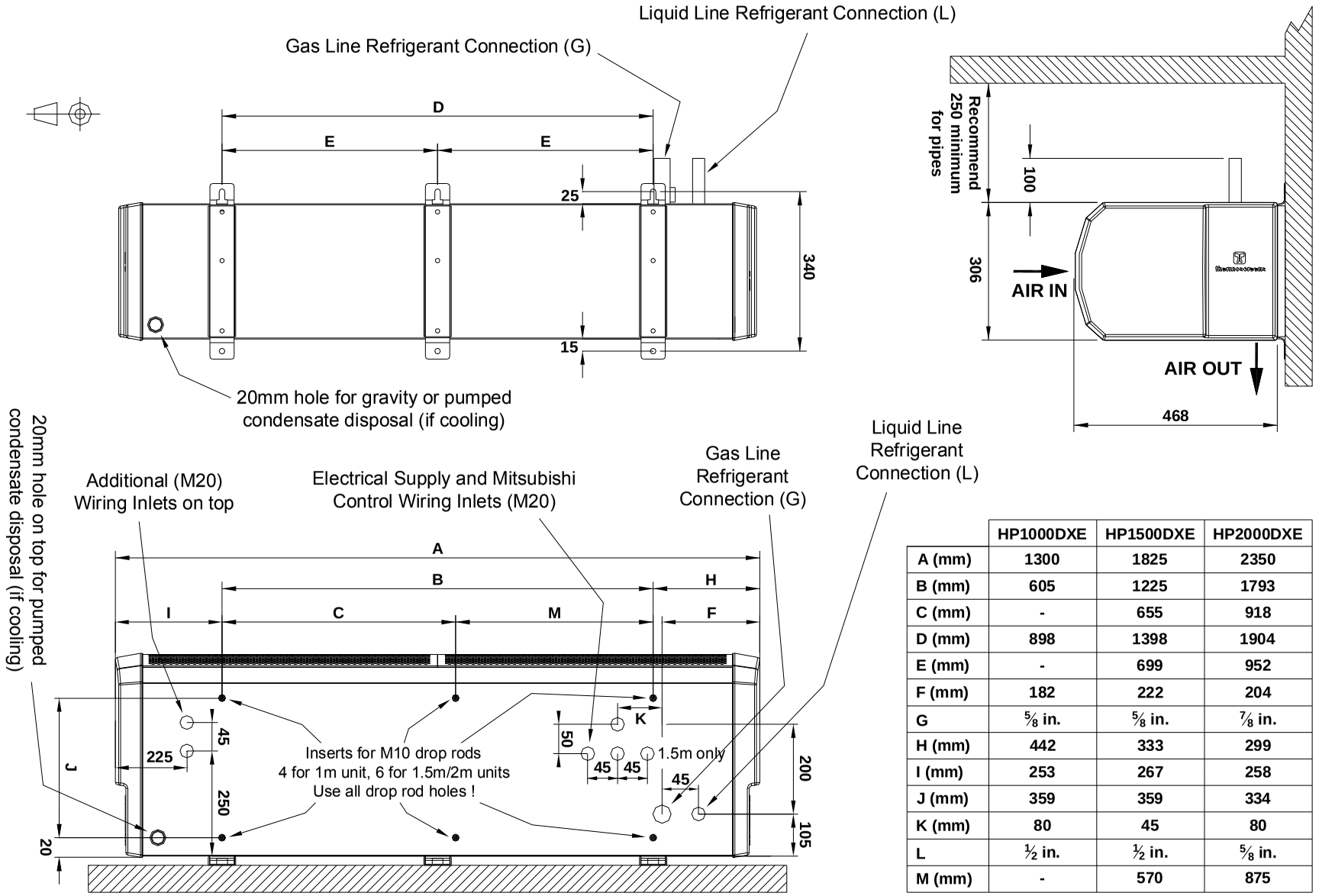
Step 1. Refer to Figure 2, Page 11 for mounting details and drill the fixing points in the wall.
Step 2. Screw in the top wall bolts leaving a small gap between the head and the wall. Lower the unit onto the bolts via the key-hole slots in the top of the wall brackets and then screw in the bottom wall bolts.
Step 3. Ensure all fixing bolts are tightened and the air curtain is safely secured to the wall.

Ceiling Suspension



M10 threaded inserts are provided in the top face of the unit (see Figure 2, Page 11 for positions) so it can be suspended on M10 threaded hanging rods (not provided). All suspension points must be used. Ensure each of the hanging rods is secured onto a suitable structure that can support the weight of the unit (see table above)*. Screw the hanging rods into the inserts by a minimum or 20mm and fit locking nuts (not provided) to prevent the rod rotating and coming away from the casing. Do not screw the hanging rod too far in or it could interfere with internal components.

* It is the sole responsibility of the installer to ensure that the building fixing locations and suspension system used are suitable for the air curtain being installed.



	HP1000DXE	HP1500DXE	HP2000DXE
A (mm)	1300	1825	2350
B (mm)	605	1225	1793
C (mm)	-	655	918
D (mm)	898	1398	1904
E (mm)	-	699	952
F (mm)	182	222	204
G	⅝ in.	⅝ in.	⅞ in.
H (mm)	442	333	299
I (mm)	253	267	258
J (mm)	359	359	334
K (mm)	80	45	80
L	½ in.	½ in.	⅝ in.
M (mm)	-	570	875

FIGURE 2 – DIMENSIONS OF HP HEAT PUMP AIR CURTAIN

Mitsubishi Electric Outdoor Unit

The Mitsubishi Electric Mr Slim Outdoor Unit is selected to match its refrigerant heat output to the size of the Air Curtain. See table below for size of outdoor unit to be used together with performance data for the air curtain.

Air Curtain	Mr Slim Outdoor Unit	Air Curtain Parameters				
		Maximum Heating Output (kW)	Maximum Cooling Output (kW)	Maximum Air Volume Flow Rate (m^3/h)	Maximum Noise Level dB(A) @3m	Effective Width of Airstream (m)
HP1000 DXE	PUHZ-RP71	8.3	7.4	1310	58	1.10
HP1500 DXE	PUHZ-RP125	13.8	12.3	2070	58	1.63
HP2000 DXE	PUHZ-RP140	15.9	14.2	2590	58	2.15
HP2000 DXE	PUHZ-RP200*	21.0	18.7	2590	58	2.15

Outputs based on:- Indoor air temperature = 20ºC. Outdoor condition = 7/6 db/wb ºC for heating output, 35/27 db/wb ºC for cooling output.
Performance figures derived from independent testing by UK test houses BRE and BSRIA in accordance with test standard EN14511. Noise testing carried out at Sound Research Laboratories to ISO3741 and BS4856-4.
See Table on Page 23 for more details of air volume flow rates and noise levels.
*** Alternative larger outdoor unit will give enhanced heat output for difficult doorway situations - not recommended, however, for weather compensation control or discharge air temperature control.**

Refrigerant Pipework

This must be carried out before connection of any electrical and controls cables and in accordance with the Instructions that come with the Mitsubishi Electric Outdoor Unit. This work must only be undertaken by a Mitsubishi Electric approved Contractor.

Contact Mitsubishi Electric for recommended pipework sizes, pipework lengths, numbers of fittings, etc.

The installation must be carried out in accordance with the Mitsubishi Electric Installation Manual that comes with the outdoor unit.

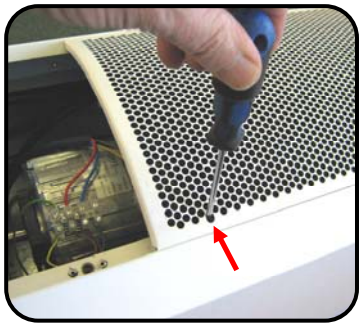
It is intended that refrigerant pipe connections to the air curtain are made using brazed joints and these must be carried out in a professional and safe manner. If installation pipe sizes for the discharge (gas) line and liquid line are different from the pipe connection sizes on the air curtain (see Figure 2, Page 11) suitable pipe reducers must be used for the connection. R410A refrigerant systems can operate at pressures up to 610 psi (c. 42 Bar). These brazed joints may well be located in a public area and a weakness leading to an explosion could be extremely dangerous.

The air curtain with its coil is manufactured in accordance with the Pressure Equipment Directive (PED) and the installation must be carried out to a good standard of workmanship. Remove the protective plastic film on top of the air curtain before starting work and protect the top surface of the air curtain. Use a heat sink on the copper pipes during brazing to reduce the transfer of heat to the inside of the air curtain where sensitive components are located.

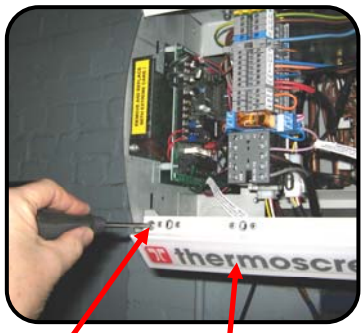
To gain access inside the Air Curtain

To gain access for connection of the electrical supply, controls wiring and to work on the unit during commissioning, remove the air inlet grilles and the bottom access panel.

First remove the plastic end caps at each end of the unit, if already fitted, by pulling off to the side (see picture).



Then remove each inlet grille in turn with its filter by unfastening the quarter-turn Philips Head fastener at the bottom corner of the grille. Use a Philips No.1 screwdriver to access the screw via the elongated hole at the bottom corner of each grille and turn anti-clockwise to remove (see picture).



To remove the bottom access panel unfasten the access panel securing screws, one at each end, plus two in the centre (HP1500 DXE and HP2000 DXE units) and slide the panel out forwards (see picture).

Please note: *All the panels of the air curtain are covered in a protective plastic film which should now be removed.*

Electrical Supply and Wiring to the Air Curtain

This must be carried out AFTER the connection of the refrigerant pipework. All electrical wiring and connections MUST be carried out by a competent qualified electrician in accordance with the latest edition of the IEE wiring regulations and/or local statutory regulations. (see also Wiring Diagrams 1 & 2 on Page 16/17)

- A local isolator having a contact separation of at least 3mm on all poles must be fitted in the 1 phase electrical supply (1L + N + E) to the air curtain and located in an accessible position adjacent to the unit.

  Do not have a switch or isolator in the S2, S3 (Comms Link), use continuous wire.
- If the defrost cycle auxiliary heater is to be used the air curtain then requires a 3 phase electrical supply (3L + N + E) to the air curtain instead of a 1 phase electrical supply. A local isolator having a contact separation of at least 3mm on all poles must be fitted in the 3 phase electrical supply and located in an accessible position adjacent to the unit. The defrost cycle auxiliary heater will need to be enabled during commissioning (see Section 'Design Information' – Page 5 and Section 'Commissioning' Page 20).
- The appliance must be connected using cables having an appropriate temperature rating (heat resistant).
- Ensure that the supply cables, circuit breakers and other electrical installation equipment are correctly sized for the air curtain being installed. See Table below.
- A 25mm size cable gland or conduit connector should be used for the Electrical Supply into the air curtain. See Figure 2, Page 11 showing where the electrical supply enters the unit.
- This appliance must be Earthed.
- Wire in accordance with **1)** or **2)** in the Table below:

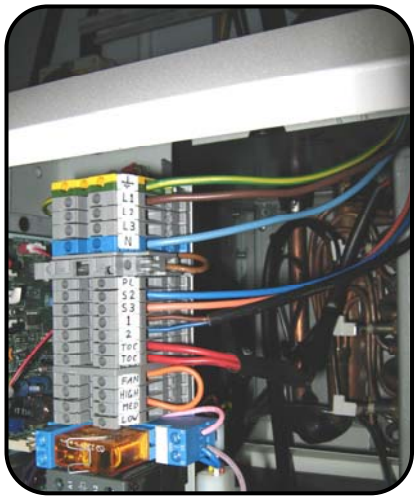
Air Curtain	**1)** Unit as supplied - defrost cycle auxiliary heater is disabled (230V/1ph/50Hz electrical supply from separate local isolator)		**2)** the defrost cycle auxiliary heater is to be enabled during commissioning (400V/3ph/50Hz electrical supply from separate local isolator)	
	Rated Electrical Power Input (kW)	Rated Current (A)	Rated Electrical Power Input (kW)	Rated Current per phase (A)
HP1000 DXE	0.2	0.8	4.7	7.3
HP1500 DXE	0.3	1.2	7.8	12.1
HP2000 DXE	0.35	1.4	9.35	14.4

1) Unit as supplied – defrost cycle auxiliary heater is disabled, see Wiring Diagram 1, Page 16 (230V/1ph/50Hz electrical supply from separate local isolator)

Connect to terminals Earth, L1 and N with a 1-phase electrical supply.

Connect terminals S2 and S3 from the outdoor unit to terminals S2 and S3 on the air curtain – Communication link between outdoor unit and the air curtain.

Connect a Mitsubishi Electric PAR-W21MAA or PAR-30MAA Remote Controller to terminals 1 and 2 on the air curtain.

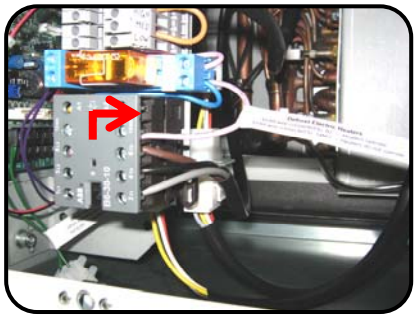


2) If the defrost cycle auxiliary heater is to be enabled during site commissioning (400V/3ph/50Hz electrical supply from separate local isolator), see Wiring Diagram 2, Page 17

Connect to terminals Earth, L1, L2, L3 and N with a 3-phase electrical supply.

Connect terminals S2 and S3 from the outdoor unit to terminals S2 and S3 on the air curtain – Communication link between outdoor unit and the air curtain.

Connect a Mitsubishi Electric PAR-W21MAA or PAR-30MAA Remote Controller to terminals 1 and 2 on the air curtain.

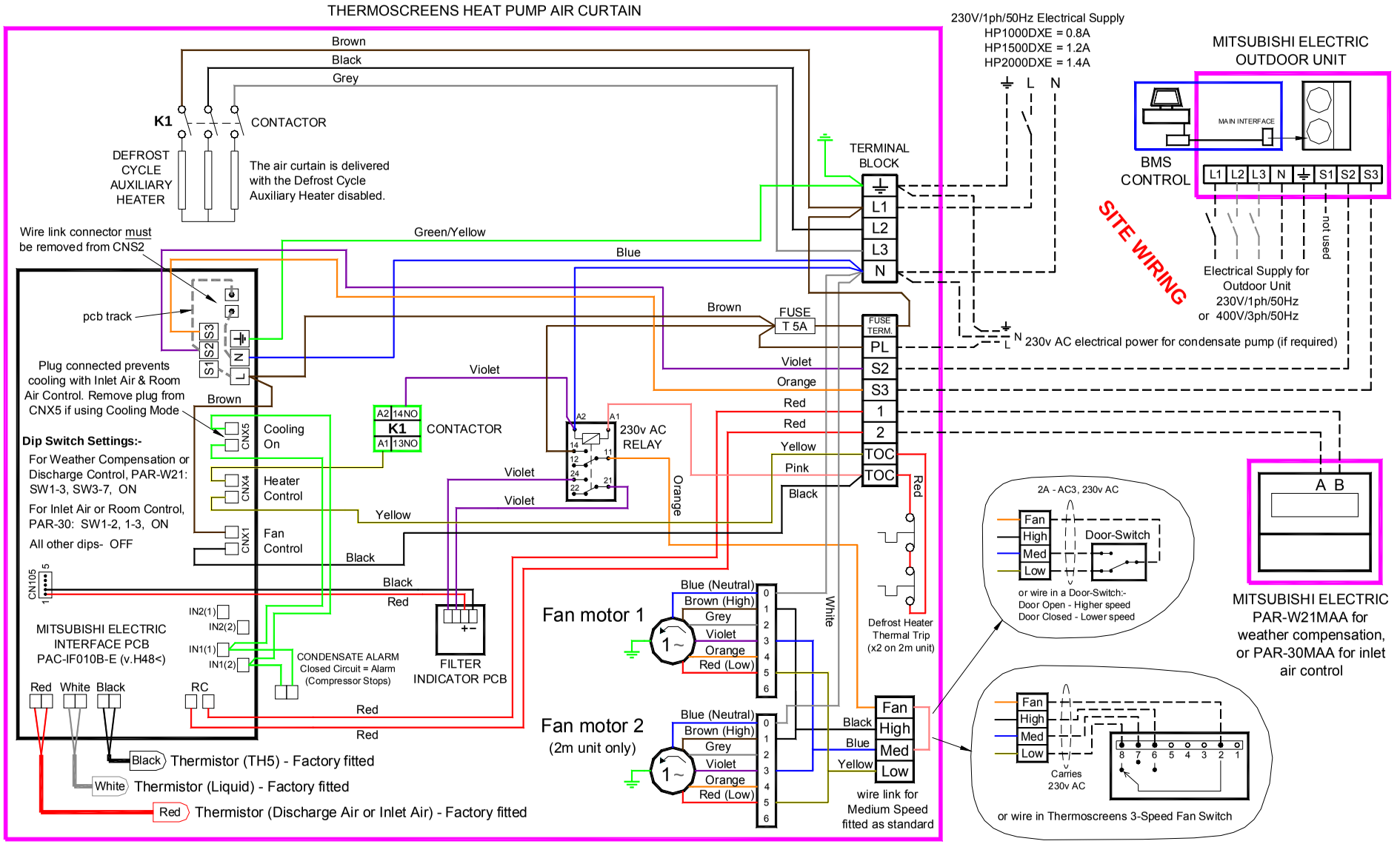


If required the defrost cycle auxiliary heater can be enabled by disconnecting the neutral wire (violet) from the auxiliary terminal 14NO on the contactor inside the air curtain. This wire is then connected onto terminal A2 on the contactor as shown in the adjacent picture (see also Wiring Diagram 2 on Page 17).

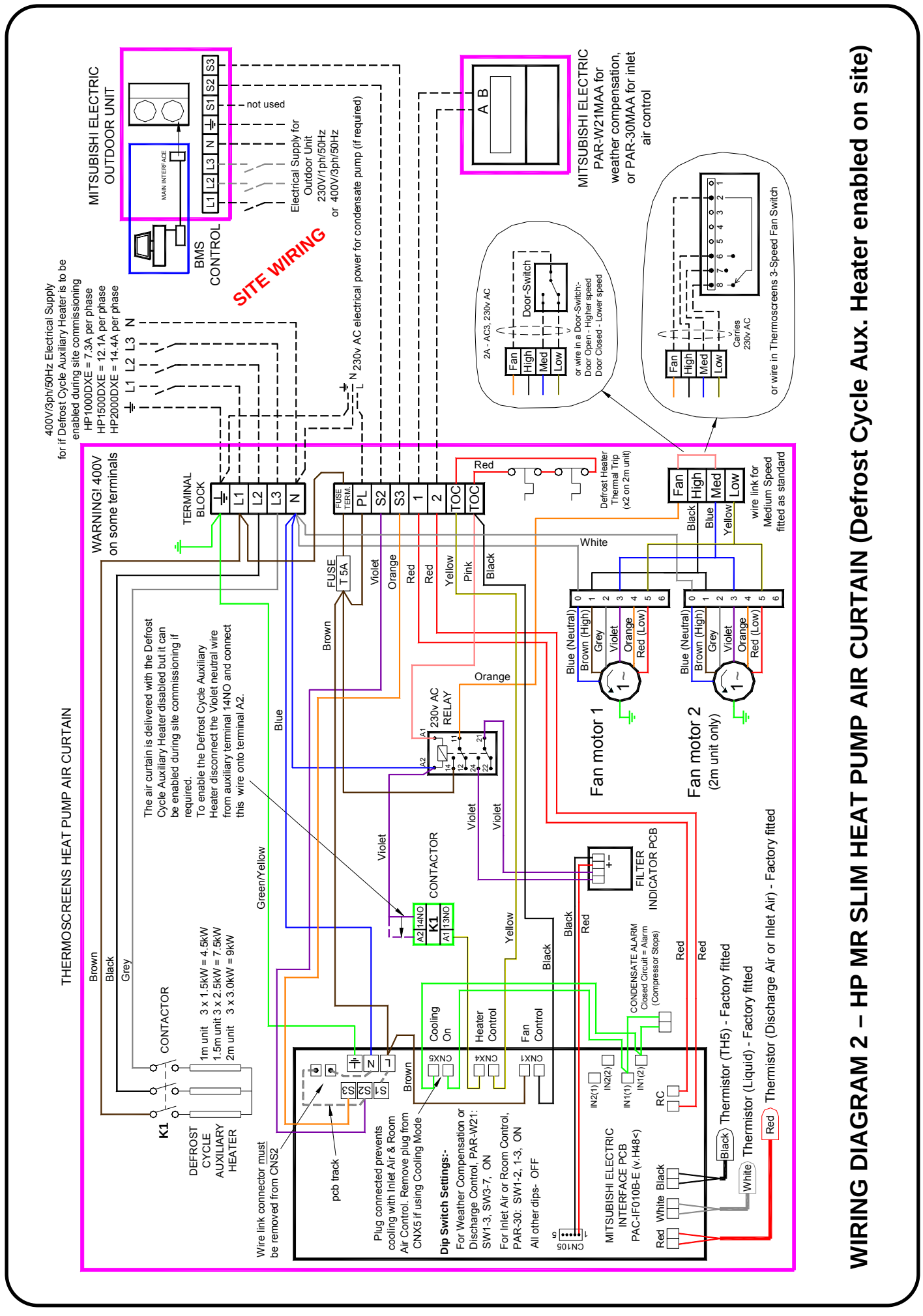
Recommended wire sizes for electrical connections are as follows:

Electrical Connection	Wire Size
1-phase electrical supply from separate local isolator	2.5mm^2 max. for access
3-phase electrical supply from separate local isolator - if the defrost cycle auxiliary heater is to be enabled	2.5mm^2 max. for access
S2, S3 – communication link between outdoor unit and the air curtain	1.5mm^2
Mitsubishi Electric PAR-W21MAA or PAR-30MAA Remote Controller (2-core cable)	0.75mm^2
Door switch to change fan speeds as door opens and shuts or Remote 3-Speed fan switch	0.75mm^2

Refer to Mitsubishi Electric for electrical details of the Mr Slim Outdoor Unit.



WIRING DIAGRAM 1 – HP MR SLIM HEAT PUMP AIR CURTAIN (No Defrost Cycle Heater – unit as supplied)


WIRING DIAGRAM 2 – HP MR SLIM HEAT PUMP AIR CURTAIN (Defrost Cycle Aux. Heater enabled on site)
THERMOSCREENS HEAT PUMP AIR CURTAIN
MITSUBISHI ELECTRIC OUTDOOR UNIT
MAIN INTERFACE
BMS CONTROL
L1 L2 L3 N S1 S2 S3
not used
Electrical Supply for Outdoor Unit 230V/1ph/50Hz or 400V/3ph/50Hz
SITE WIRING
400V/3ph/50Hz Electrical Supply for if Defrost Cycle Auxiliary Heater is to be enabled during site commissioning
HP1000DXE = 7.3A per phase
HP1500DXE = 12.1A per phase
HP2000DXE = 14.4A per phase
L1 L2 L3 N
N 230v AC electrical power for condensate pump (if required)
MITSUBISHI ELECTRIC PAR-W21MAA for weather compensation, or PAR-30MAA for inlet air control
A B
2A - AC3, 230v AC
Door-Switch
Fan High Med Low
or wire in a Door-Switch:-
Door Open - Higher speed
Door Closed - Lower speed
Carries 230v AC
or wire in Thermoscreens 3-Speed Fan Switch
WARNING! 400V on some terminals
TERMINAL BLOCK
L1 L2 L3 N
FUSE TERM.
PL S2 S3 1 2 TOC TOC
Red
Defrost Heater Thermal Trip (x2 on 2m unit)
Fan High Med Low
Black Blue Yellow
wire link for Medium Speed fitted as standard
White
FUSE T 5A
Violet Orange Red Red Yellow Pink Black
Brown
Blue
Orange
230v AC RELAY
A1 A2 11 12 14 21 22 24
Blue (Neutral) Brown (High) Grey Violet Orange Red (Low)
Fan motor 1
Fan motor 2 (2m unit only)
The air curtain is delivered with the Defrost Cycle Auxiliary Heater disabled but it can be enabled during site commissioning if required.
To enable the Defrost Cycle Auxiliary Heater disconnect the Violet neutral wire from auxiliary terminal 14NO and connect this wire onto terminal A2.
Green/Yellow
Violet
Violet
Violet
Yellow
Black
Red
Red
CONTACTOR
A2 14NO K1 A1 13NO
FILTER INDICATOR PCB
Brown
Black
Grey
CONTACTOR
1m unit 3 x 1.5kW = 4.5kW
1.5m unit 3 x 2.5kW = 7.5kW
2m unit 3 x 3.0kW = 9kW
K1
DEFROST CYCLE AUXILIARY HEATER
Wire link connector must be removed from CNS2
pcb track
Plug connected prevents cooling with Inlet Air & Room Air Control. Remove plug from CNX5 if using Cooling Mode
Dip Switch Settings:-
For Weather Compensation or Discharge Control, PAR-W21: SW1-3, SW3-7, ON
For Inlet Air or Room Control, PAR-30: SW1-2, 1-3, ON
All other dips- OFF
Cooling On
Heater Control
Fan Control
CNX5 CNX4 CNX1
CONDENSATE ALARM Closed Circuit = Alarm (Compressor Stops)
IN2(1) IN2(2) IN1(1) IN1(2) RC
MITSUBISHI ELECTRIC INTERFACE PCB PAC-IF010B-E (v.H48<)
CN105
Red White Black
Black Thermistor (TH5) - Factory fitted
White Thermistor (Liquid) - Factory fitted
Red Thermistor (Discharge Air or Inlet Air) - Factory fitted

Wiring of Air Curtain Fan Speed

As delivered the air curtain is link wired to operate on a single fan speed at its medium speed, see picture opposite. Current thinking for air curtain technology, however, is to have a Door-Switch wired to switch the unit between a Higher fan speed - Door Open and a Lower fan speed - Door Closed. This is both energy efficient and noise friendly. Alternatively a single fan speed, High, Medium or Low, can be set at commissioning to suit the general weather conditions of the site. Both methods prevent the end user switching fan speeds and maybe leaving the air curtain on an unsuitable setting.

If the end user does require remote fan speed switching, however, there is a wall mounted 3-speed fan switch supplied with the air curtain which can be fitted next to the Mitsubishi Electric PAR-W21MAA or PAR-30MAA Remote Controller. The end user can then remotely select High, Medium or Low fan speeds if they choose to.

A door switch, wire link for single speed or the 3-speed fan switch is wired to terminals FAN, HIGH, MED and LOW in the Air Curtain using 230V mains rated double insulated cable of size 0.75mm^2. See also Wiring Diagram 1 or 2 on Pages 16 and 17 and Section, Commissioning; 'Selecting the fan speeds of the air curtain' on page 22 which gives details as to how the available speeds of the six speed fan motor(s) can be set to suit outdoor environmental conditions and indoor noise levels.

Condensate Disposal System

Cooling is only possible if the air curtain is modified during commissioning to operate under **Inlet Air Temperature Control** or **Room Air Temperature Control**. It will not operate in cooling if set-up to operate under **Weather Compensation Control** or **Discharge Air Temperature Control**, which is how the air curtain is supplied.

If it is intended to use the air curtain in cooling mode the plug must be removed from CNX5 on the PAC-IF010 Interface PCB (see Wiring Diagrams 1 & 2 on Pages 16 and 17) and a condensate disposal system must be installed.

The air curtain is fitted with a condensate drain tray with 15mm copper outlet pipe at the right hand side of the air curtain. Suitable condensate hose can be fitted to the pipe (see picture) and fed through a 20mm hole at the back of the unit, see Figure 2, Page 11, so condensate will gravity drain away. Means of condensate disposal must then be provided at the rear of the air curtain.

If it is not practical to gravity drain from the air curtain a suitable condensate pump (not supplied with the unit) can be supplied and fitted by the installer to remove condensate directly from the unit. The condensate pump must be of sufficient capacity (see Table below) and if located higher than the drain tray; self priming and capable of providing the appropriate suction head so the pump will lift condensate out from the top of the air curtain. Suitable condensate pumps with a suction head are Peristaltic or Rotary

Diaphragm type. It is recommended that the condensate pump has the facility so it only operates when the air curtain is in cooling mode by detection of water in the drain tray or by detecting a cooling differential in the airflow. It should also have a pump overrun to empty the drain tray as much as possible when the air curtain is switched off. We recommend the Blue Diamond rotary diaphragm type with cooling signal sensor (drainStik) manufactured by Charles Austen Pumps Ltd. (www.miniblue.co.uk).

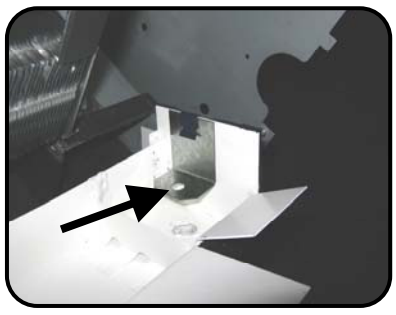
Air Curtain	Maximum likely condensate flow rate (litres/hour)
HP1000 DXE	6.0
HP1500 DXE	9.0
HP2000 DXE (with a PUHZ-RP140)	11.0
HP2000 DXE (with a PUHZ-RP200)	15.0

There is space inside the air curtain at the right hand end of the unit to mount a condensate pump. A permanent 230V AC, single phase electrical supply is provided inside the air curtain at the DIN-Rail terminals to power the pump. See Wiring Diagrams 1 & 2 on Pages 16 and 17. There are two 20mm condensate outlet holes in the casing, one at the top of the unit and a lower one at the rear, both fitted with rubber plugs (see Figure 2, Page 11). These can be used to feed a hose from the condensate pump to a remote condensate drain.

Condensate drain hose should be pushed through either of the two condensate outlet holes after removing the plug and connected to the condensate pump using the adapter supplied with the pump. It may be necessary to extend the hose if the pump is remotely located.

Whether a gravity drain system or a condensate pump is used to remove the condensate there should be an alarm system with appropriate sensor fitted in the drain tray that will give a volt-free signal (closed circuit = alarm). A 2-wire condensate alarm signal should be wired back to the condensate alarm connection provided at the Interface PCB inside the air curtain. This will stop the air curtain cooling if the condensate drain tray is in danger of flooding, bringing up an error code on the Mitsubishi Electric system (air curtain fans will continue to operate).

There is a fixing bracket with 8mm diameter hole attached to the drain tray inside the air curtain so a condensate alarm sensor can be fixed in the tray by the installer. Hinge the drain tray down to gain better access to the fixing bracket (see picture and Section, Servicing – Page 33). Enlarge the hole if necessary to suit the type of sensor being used so it is located in the tray at the appropriate position. If a condensate pump is being used see the manufacturers instructions that come with the pump for further information.

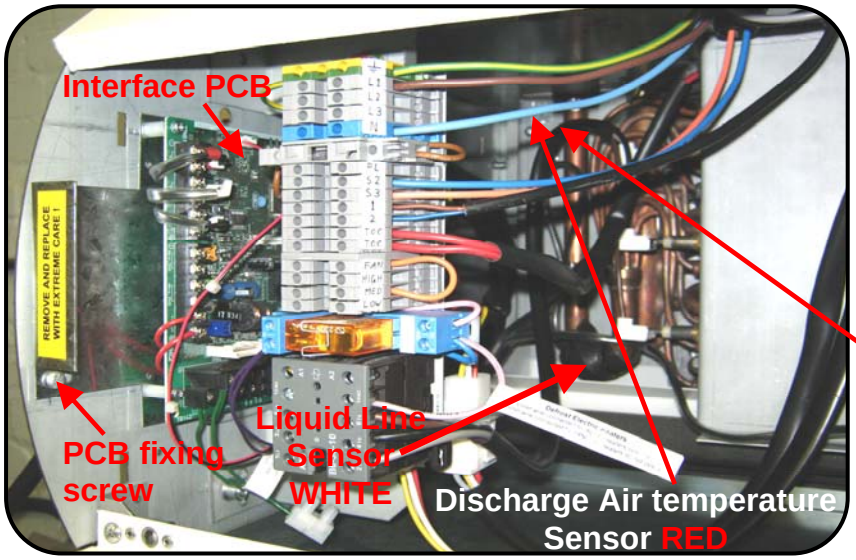


COMMISSIONING THE AIR CURTAIN

Ensure that the electrical supply to the Mitsubishi Electric Outdoor Unit and, if applicable, the 3-phase local electrical supply to the Air Curtain, are switched off.

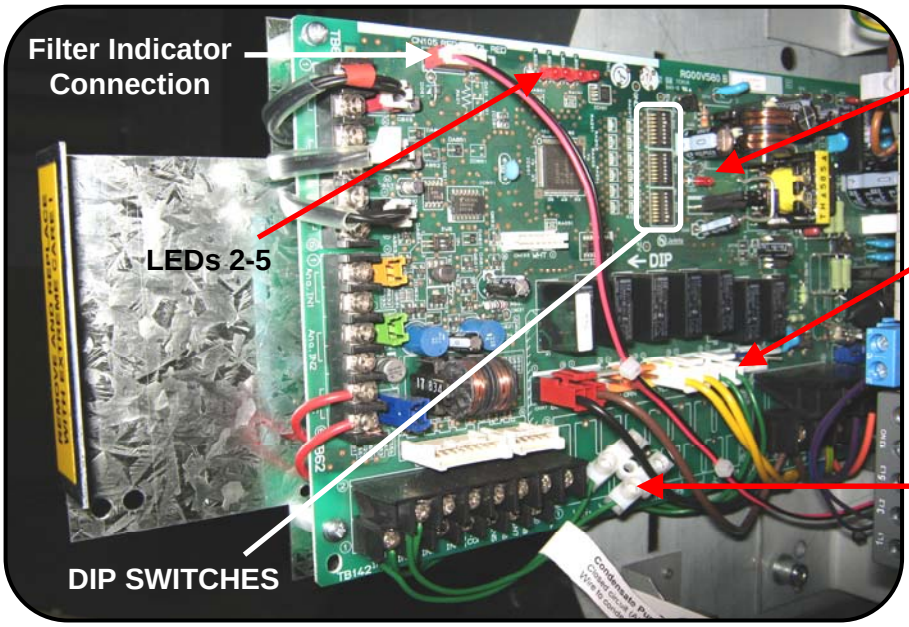
Air Curtain Checks

Check that the components inside the air curtain are as shown in the picture below. If the defrost cycle auxiliary heater has been enabled check that the thermal overheat cut-out switch(s) has not 'tripped'. Press the reset button at the top of the unit (2 on a HP2000 DXE unit). If the cut-out switch has tripped it will click back on – see picture



Shown set up for Weather Compensation/Discharge Air Temperature Control. See Page 21 to see set-up for Inlet Air/Room Air Temperature Control.

There is a Mitsubishi Electric Interface PCB located within the left hand end of the Thermoscreens Air Curtain. This provides control and communication between the Mitsubishi Electric Outdoor Unit and the Air Curtain Indoor Unit. It is held in place by a fixing screw located in the left-hand end panel of the air curtain under the left-hand plastic end cap. Remove the screw and carefully slide the PCB partially out. For easier withdrawal of the PCB the filter indicator connection may be temporarily removed.


Filter Indicator Connection
LEDs 2-5
DIP SWITCHES
LED 1
Un-plug green plug CNX5 for cooling mode with Inlet Air or Room Air Temp. Control
Condensate Pump Alarm Connection

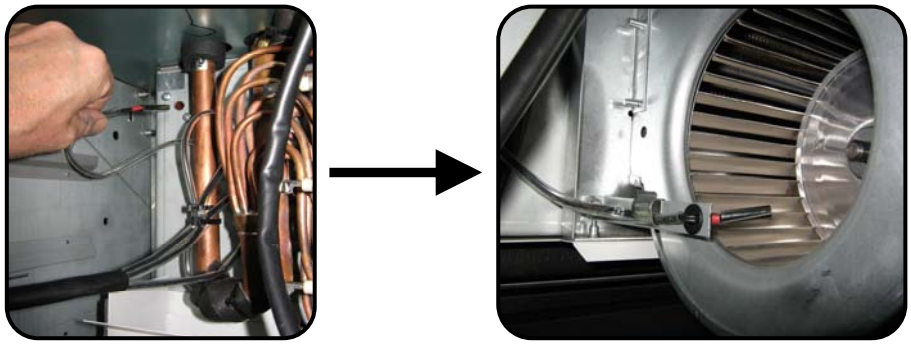
Dip Switch Settings and Air Temperature Sensor Position

As supplied the air curtain is set-up to be operated under Weather Compensation Control (HEATING ECO) or Discharge Air Temperature Control (HEATING) and the air temperature sensor (marked red) is located in a temperature pocket in the air discharge plenum of the unit. Check that the dip switches on the Interface PCB are set as follows:

For Weather Compensation Control or Discharge Air Temperature Control

Black rectangle indicates moveable head of dip switch

If the air curtain is going to be operated under Inlet Air Temperature Control the air temperature sensor (marked red) needs to be removed from its temperature pocket in the air discharge plenum of the unit and fitted in the inlet air to the fan on the bracket provided, see pictures showing this.



If the air curtain is going to be operated under Room Air Temperature Control it does not matter where the air temperature sensor (marked red) is located as air temperature sensing is now done at the PAR-30MAA Remote Controller. The PAR-30MAA Remote Controller will need to be set up via its Installer Menu so that temperature sensing is done at the controller. See instructions that come with the controller. Check that the dip switches on the Interface PCB are set as follows:

For Inlet Air Temperature Control or Room Air Temperature Control

Black rectangle indicates moveable head of dip switch

Check that the wiring between the air curtain and the Mr Slim outdoor unit is in accordance with Wiring Diagrams 1 & 2 on Pages 16 and 17. If the Interface PCB is still withdrawn, carefully slide it back into place and re-plug the Filter Indication connection into CN105 if removed earlier. Ensure cables are not trapped inside and refit the retaining screw.

On the PCB in the Mitsubishi Electric Mr Slim Outdoor Unit SW8-3 to be ON.

Selecting the Fan Speeds of the Air Curtain

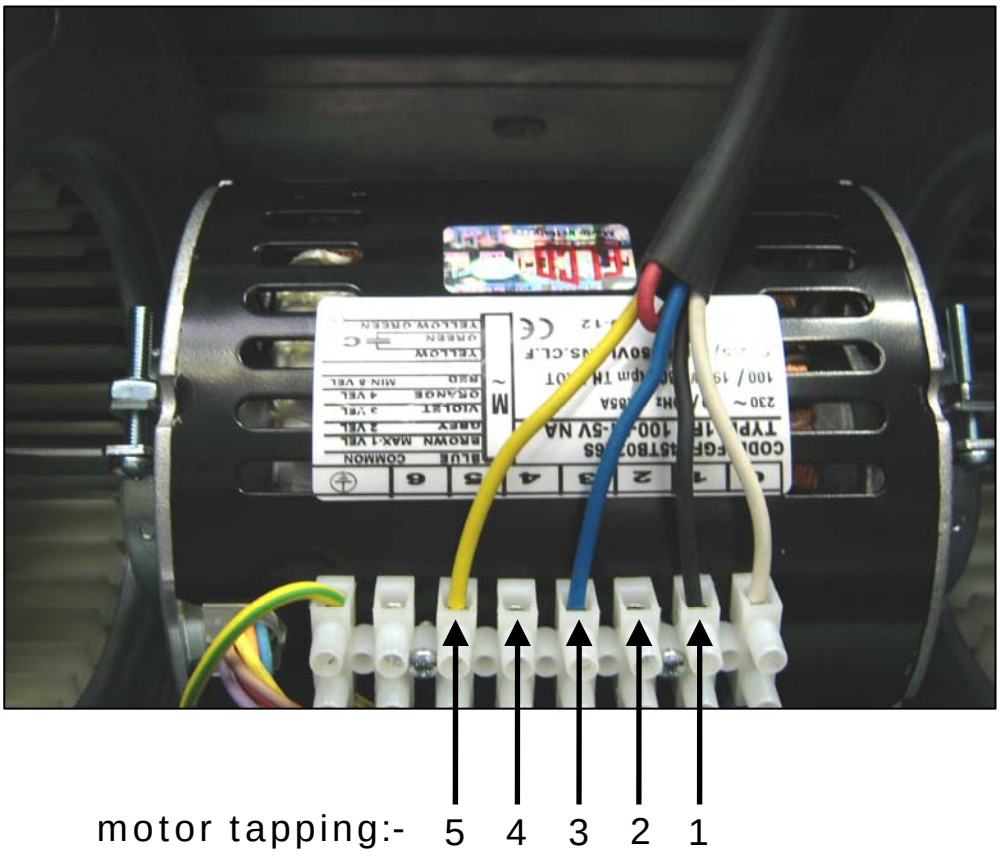
The fan motor(s) in the air curtain is a 5-speed motor and fan speeds can be re-selected at commissioning to suit the installation, both to suit the outdoor environmental conditions and for indoor noise levels.

As delivered, for the 3 fan speeds available at the fan speed DIN rail terminals:-

the HIGH fan speed (black wire) is wired into motor tapping 1 (highest motor speed tapping),

the MEDIUM fan speed (blue wire) is wired into motor tapping 3,

the LOW fan speed (yellow wire) is wired into motor tapping 5 (lowest motor speed),



The table below provides guidance as to how the fan speeds can be set. WARNING: There are two motors on the HP2000DXE model, make sure both motors are wired up in exactly the same way or the motors will overheat with possible damage.

Fan Speed (air curtain as delivered)	**Motor Speed Tapping** (see Wiring Diagram 1, Page 18 or Wiring Diagram 2, Page 19)	**Maximum air curtain mounting height** (m)	**Sound Pressure Level of air curtain** [dB(A) at 3m]	**Air Volume Flow Rate** (m^3/h)
HIGH (black wire)	1 – (Highest speed)	3.2	HP1000DXE - 57 HP1500DXE - 56 HP2000DXE - 57	1310 1970 2590
	2	2.8	HP1000DXE - 56 HP1500DXE - 54 HP2000DXE - 56	1250 1860 2480
MEDIUM (blue wire)	3	2.4	HP1000DXE - 54 HP1500DXE - 52 HP2000DXE - 54	1170 1750 2340
	4	2.0	HP1000DXE - 51 HP1500DXE - 49 HP2000DXE - 51	1030 1460 2070
LOW (yellow wire)	5 – (Lowest speed)	1.7	HP1000DXE - 47 HP1500DXE - 45 HP2000DXE - 47	900 1240 1810

See also Section, Installation; 'Wiring of Air Curtain Fan Speed' on Page 18 giving details of how to wire in fan speeds.

Sound pressure levels dB(A) at 3m distance are for a single air curtain mounted at its maximum mounting height, operating in a room with average acoustic characteristics as defined in CIBSE Guide B5 (reverberation time 0.7s at 1kHz) and a room size equivalent to 8 air changes per hour (ac/h). Care needs to be taken when selecting air curtains for an installation as noise levels can be several dB higher if the mounting height is reduced, if the room is more 'live' (i.e. hard surfaces, no furnishings or absorbent materials), if the room is smaller than 8 ac/h equivalent or a combination of these factors. Noise levels will also increase if more than one air curtain is installed at the same doorway (e.g. +3dB(A) for 2 equal point sources: direct field).

Starting the Heat Pump System

Carry out a final inspection to ensure that all wiring is in accordance with Wiring Diagram 1 on Page 16 or wiring Diagram 2 on Page 17 and that all connections have been properly made. Ensure that the refrigerant system is complete, there are no leaks and there is sufficient charge of refrigerant R410A. Switch on electrical power to the Mitsubishi Electric outdoor unit and the local electrical supply to the air curtain.
WARNING! The Interface PCB inside the air curtain will have 230 volts on it and there will be 400V on some air curtain terminals if the defrost cycle auxiliary heater is enabled.

The system will 'boot-up' and when the screen on the PAR-W21MAA or PAR-30MAA Remote Controller becomes active it will repeat the message "PLEASE WAIT". After several minutes when the PLEASE WAIT message has stopped the system is ready to start.

DANGER: Beware of Fans Starting!

Turn the air curtain on using the ON/OFF Button on the Remote Controller and the air curtain fans will start straight away.
If a door switch has been installed to change fan speeds from High (door open) to Low (door closed) check this operates correctly.
If the remote 3-Speed fan switch has been installed check that the fans run at HIGH speed, MEDIUM speed and LOW speed by operating the slider switch.
If there is no door switch or remote 3-Speed fan switch a wire link will have been fitted to the fan speed terminals on the air curtain. Set the wire link to one of the three fan speeds (LOW, MED or HIGH) appropriate to the site conditions (see Page 18 and 22). Check there is no mechanical noise coming from the fans at any of the fan speeds and that all fans are working.

If the Air Curtain is set-up for :-

Weather Compensation Control (HEATING ECO mode)
or
Discharge Air Temperature Control (HEATING mode)

(this is how the air curtain is supplied)

with a PAR-W21MAA Remote Controller :-

Switch the Mode Button on the PAR-W21MAA to 'HEATING' mode (Discharge Air Temperature Control) and adjust the target temperature to 40°C using the ▲TEMP Button. Check that the air stream from the discharge grille warms up across the whole length of the air curtain after approximately 15 minutes of operation and that the air stream reaches right down across the doorway with the door open or closed.

NB. Cooling is not possible with Weather Compensation Control (HEATING ECO mode) or with Discharge Air Temperature Control (HEATING mode).

For the Air Curtain to be used for Weather Compensation Control (HEATING ECO mode) with a PAR-W21MAA Remote Controller, the Heating Curve and Function Limits must now be set-up as follows :-

Refer to PAR-W21MAA diagram, Figure 3, and typical heating curve in Figure 4 and set up the Heating Curve:

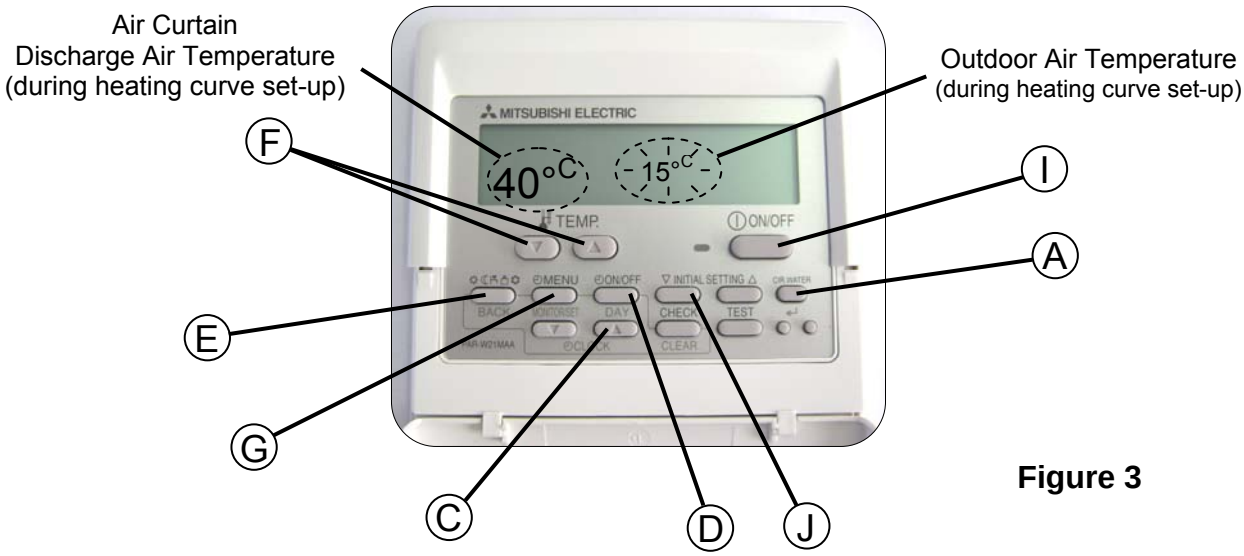


Figure 3

NB. Read 'Water Temperature' on the screen as meaning 'Air Curtain Discharge Air temperature' for this application

1. Press button **I** to switch air curtain ON
2. Press button **E** to get 'HEATING ECO' mode
3. Press button **J** for 3 seconds, screen then says 'LOADING' for 30 secs
4. When 'WATER TEMP HEATING' is displayed on the screen press the **E** button to go to screen 'WATER TEMP HEATING ECO no 1'
5. Use the **F** ▼ or ▲ buttons to set the flashing Outdoor Air Temperature 'Graph Point **1**' set this to **0°C**
6. Press button **D** to make the Discharge Air Temperature flash at left of screen
7. Use the **F** ▼ or ▲ buttons to set the flashing Discharge Air temperature 'Graph Point **2**' set this to **40°C**
8. Press button **E** to go to screen 'WATER TEMP HEATING ECO no 2'
9. Use the **F** ▼ or ▲ buttons to set the flashing Outdoor Air temperature "Graph Point **3**" set this to **15°C**
10. Press button **D** to make the Discharge Air Temperature flash at left of screen
11. Use the **F** ▼ or ▲ buttons to set the flashing Discharge Air Temperature "Graph Point **4**" set this to **20°C**
12. Press button **A** and screen then says 'SETTING' for 25s as the heating curve program is written to the Interface PCB in the Air Curtain
13. Press button **I** to return to the 'HEATING ECO' screen

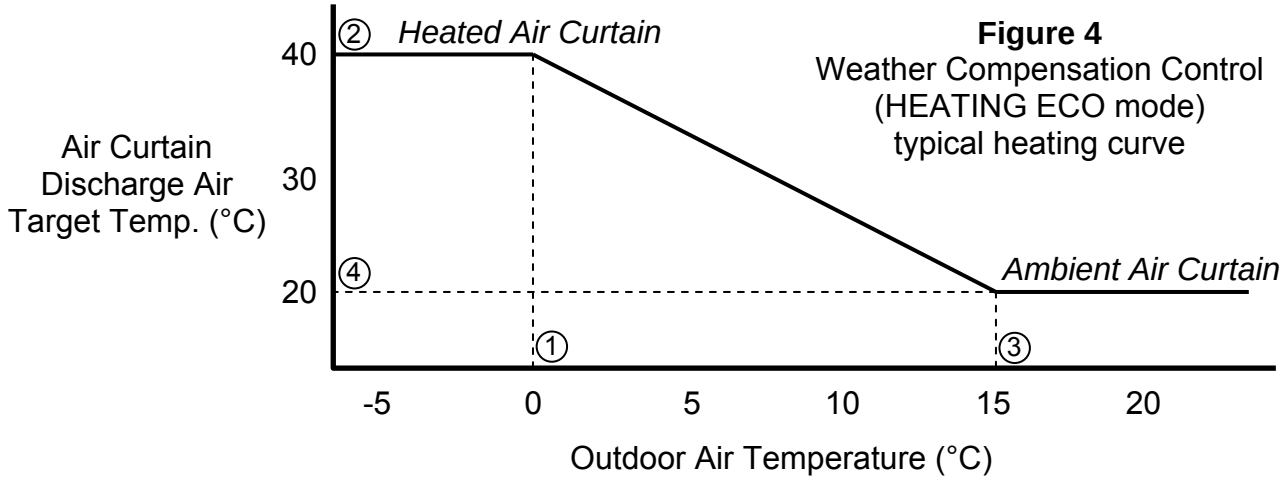


Figure 4
Weather Compensation Control
(HEATING ECO mode)
typical heating curve

In case of difficulty refer to the Mitsubishi Electric instruction booklet that comes with the PAR-W21MAA Remote Controller, Section 7 – Initial Setting, Page 22.

Check the operation of the air curtain in Weather Compensation Control (HEATING ECO mode). The smaller number in the middle of the screen shows the actual discharge air temperature and the larger number at the left of the screen indicates the discharge air 'target temperature' as calculated against the outdoor air temperature by the heating curve above (see User Instructions, Page 31).

Now set the Function Limit in the PAR-W21MAA Remote Controller to skip the Hot Water mode and Anti-freeze mode (refer to Figure 3):

1. Press button **I** to switch air curtain OFF
2. Hold down button **E** and button **D** together for 2 seconds, screen will say 'CHANGE LANGUAGE'
3. Press button **E** , screen will say 'FUNCTION SELECTION'
4. Press button **G** , screen will say 'LOCKING FUNCTION'
5. Press button **G** again, screen will say 'SELECT HEATING'
6. Press button **D** , screen will say 'SELECT HEATING ECO'
7. Press button **D** again, screen will say 'SELECT HOT WATER'
8. Press button **J** to change **on** to **oFF** on the screen
9. Press button **D** , screen will say 'SELECT ANTI-FREEZE'
10. Press button **J** to change **on** to **oFF** on the screen
11. Press button **E** , screen will say 'MODE SELECTION' – flashing!
12. Hold down button **E** and button **D** together for 2 seconds and this instruction is written to the PAR-W21MAA Remote Controller

NB. It is also possible to skip HEATING mode (Discharge Air Temperature Control) using the above key strokes so only the more energy efficient Weather Compensation Control (HEATING ECO mode) can be selected.

In case of difficulty refer to the Mitsubishi Electric instruction booklet that comes with the PAR-W21MAA Remote Controller, Section 6 – Operation mode skip setting, Page 19 & 20.

If the Air Curtain is set-up for :-

Inlet Air Temperature Control
or
Room Air Temperature Control

(air curtain has been modified during commissioning)

with a PAR-30MAA Remote Controller, BMS or Centralised Controller :-

Switch the Mode Button on the PAR-30MAA Remote Controller to 'HEAT' and adjust the target temperature to 28°C maximum setting using the **+ Temp.** Button. Check that the air stream from the discharge grille warms up across the whole length of the air curtain after approximately 15 minutes of operation and that the air stream reaches right down across the doorway with the door open or closed.

If the end user is to operate the air curtain with a Remote Controller it can be set-up to monitor room air temperature at the controller instead of return air temperature at the air inlet of the air curtain. If this is required see the Mitsubishi Electric remote controller instructions for details.

If it is intended that the air curtain is to ever operate in cooling mode* switch the Mode Button on the PAR-30MAA remote controller to 'COOL' and adjust the target temperature to 14°C minimum setting using the **- Temp.** Button. Wait for the air curtain air stream to go cold. Check there is no debris in the outlet spout, there are no kinks in condensate hoses and the condensate pump (if used) will operate. It is unlikely that condensate will fill the drain tray straight away so it will be necessary to fill the tray manually with water to see if the condensate removal system is working satisfactorily. If an alarm sensor is fitted in the drain tray, check it operates to stop the air curtain cooling if the drain tray becomes too full. Test the air curtain for a time in cooling mode with all the panels and grilles fitted and if environmental conditions permit check that condensate is being collected and pumped away by the condensate pump. No condensate should leak out of the air curtain. At the end of the cooling test remove the inlet grilles and the bottom access panel and check that the inside of the air curtain has remained dry and that all condensate was collected by the removal system.

***** For the air curtain to operate in cooling mode the plug must be removed from CNX5 on the PAC-IF010 Interface PCB (see Wiring Diagrams 1 & 2 on Pages 16 and 17). There must also be a condensate disposal system fitted.

To conserve energy and carbon resources it is recommended to set up the PAR-30MAA Remote Controller, BMS System or Centralised Controller so it operates in HEAT Mode at a target temperature of 24°C. This is the normal mode of operation for the heat pump air curtain and it should run in this set-up with no further adjustments, automatically heating as required. If the target temperature is reached the air curtain fans will still operate but the air stream is then not heated (ambient air curtain).

If the end user is to operate the air curtain with a PAR-30MAA Remote Controller, set up the No.1 locking function on the controller so they can only switch the air curtain ON or OFF, with no control of mode or target temperatures. See user instructions for the Mitsubishi Electric PAR-30MAA Remote Controller.

If the air curtain is to be operated from a BMS System or Centralised Controller this should be configured so that the air curtain can only operate in HEAT or FAN mode if it is not fitted with a condensate disposal system. The air curtain should only be configured to operate in COOL mode if it is fitted with a condensate disposal system.

Switch off the electrical power to the Air Curtain and the Mitsubishi Electric Outdoor Unit. Carefully slide the Interface PCB back into place and re-plug the Filter Indication connection into CN105 if removed earlier. Ensure cables are not trapped inside and refit the retaining screw.

Filter Dirty Indicator

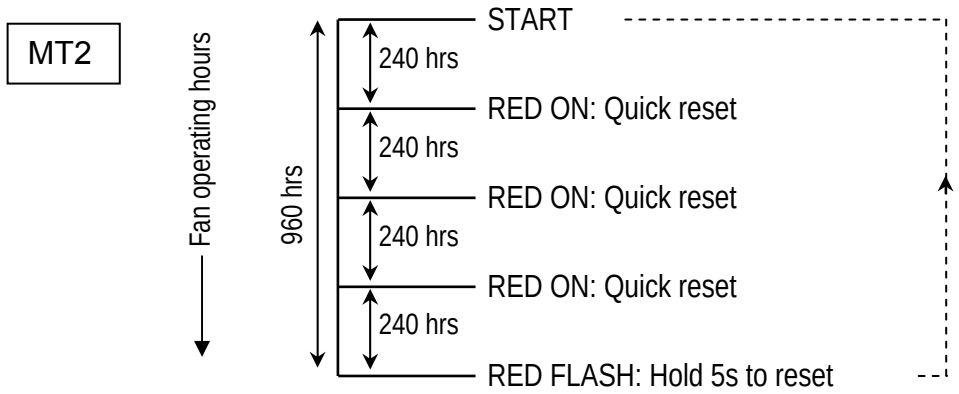
The air curtain is fitted with a Filter Dirty Indicator. It is located at the left-hand end of the outlet grille and signals when the air curtain inlet grille/filters should be vacuum cleaned or the air curtain requires servicing.

NB.The filter dirty interval feature on the Mitsubishi Electric remote controller is not available.

The indicator states are outlined below:

Indicator State	Indicator Light	Action Required	Reset Button
GREEN FLASH	On 0.5s; Off 3s	None	N/A
RED ON	On permanently	Vacuum inlet	Quick reset
RED FLASH	On 0.5s; Off 0.5s	Service filters	Press for 5s

The filter indicator schedule is based on fan operating hours. For the default schedule, shown schematically below, the inlet grilles should be vacuum cleaned every 240hrs of fan operation (3 to 4 weeks depending on use) and a full service should take place every 960hrs of fan operation (4 to 6 months depending on use).



The factory set default schedule is suitable for most applications. However, the actual frequency of cleaning required will depend on the environment. Two alternative filter indicator schedules are available, and can be selected by changing the 'jumper' position (marked 1, 2 or 3) on the Filter Indicator PCB.

Filter Indicator Schedule	Half Period	Default Period	Double Period
Jumper position	**1** 2 3	1 **2** 3	1 2 **3**
Inlet grille vacuum interval	120 hrs	240 hrs	480 hrs
Filter service interval	480 hrs	960 hrs	1920 hrs

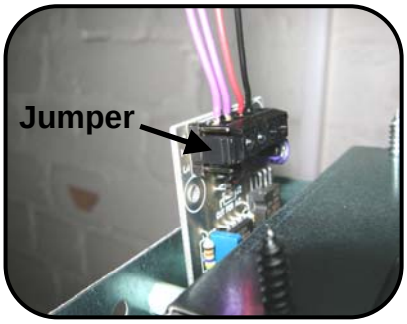
To access the Filter Indicator PCB to change jumper position:-

Switch off the electrical power to the Air Curtain. Remove the plastic end caps, inlet grilles and bottom access panel, see 'To gain access inside the Air Curtain', Page 13.

Unfasten the two screws as shown in the picture at the left hand end of the discharge grille.

Gently lower the left-hand end of the discharge grille, supporting it from below. The Filter Indicator PCB is now accessible to change the jumper position.

Once the filter indicator PCB 'jumper' has been re-positioned, push the discharge grille back up into place and re-fasten the screws. Replace bottom access panel, inlet grilles and plastic end caps in reverse order.



Final Check of the Unit

Replace the bottom access panel, air inlet grilles (with filters) and plastic end caps (see 'To gain access inside the Air Curtain', Page 13).

Power-up both the Outdoor Unit and the Air Curtain and re-check the operation of the unit.

Hand-over to End-User

Before leaving site it is important that there is a 'Hand-Over Meeting' to hand-over the heat pump system and air curtain installation to the end user or their representative. This should include a full and clear explanation of how the system operates and a demonstration showing the air curtain running. Be sure to explain the Filter Indicator Schedule, that the air inlet grilles and air filters must be regularly vacuum cleaned and the unit serviced at regular intervals. See “Servicing the Air Curtain”, Page 33.

If the air curtain is to be operated with **Weather Compensation Control (HEATING ECO mode)** or **Discharge Air Temperature Control (HEATING mode)** using a PAR-W21MAA remote controller:-

Make sure the end user understands how to select HEATING ECO mode and HEATING mode and how the system will operate in each mode. Show the end user that by selecting HEATING mode with the lowest target temperature (20°C) the air curtain can operate in FAN only (Ambient) mode. Leave the system set to HEATING ECO to promote energy saving and lock all buttons on the PAR-W21MAA remote controller except the ON/OFF button before leaving site (Locking Function No.1).

If the air curtain is to be operated with **Inlet Air Temperature Control** or **Room Air Temperature Control** using a PAR-30MAA remote controller:-

Make sure the end user understands how the heat pump system works. That the air curtain operates in FAN (Ambient) mode or in HEAT mode with a fixed target temperature of, say, 24°C. If a condensate drain system has been installed and it is intended that the unit is to operate in cooling mode, show the end user how the COOL mode operates. Leave the system set to HEAT and lock all buttons on the PAR-30MAA remote controller except the ON/OFF button before leaving site (Locking Function No.1).

Explain how the fan speeds operate if there is a door operated fan speed switch, remote 3-speed fan switch or if the fan speed has been fixed.

If the air curtain is to be operated under the control of a BMS System or Centralised Controller, explain all the settings and demonstrate the operation of the system. That the air curtain should be operated in FAN (Ambient) mode or in HEAT mode with a fixed target temperature of, say, 24°C. It is vital they understand that the air curtain must not be run in COOL mode if a condensate drain system has not been installed.

If a condensate pump and drain system has been fitted and the air curtain is to be operated in COOL mode explain that the target temperature should be adjusted to a comfortable level of cooling, not necessarily to the lowest target temperature possible as this uses a lot more energy and increases the carbon footprint.

Explain to the end user that the doorway should be closed whenever possible but that during times of high pedestrian use it will become effectively ‘open doorway’. The air curtain serves an essential purpose by saving energy and providing comfort to the occupants when compared to an open doorway with no air curtain fitted.

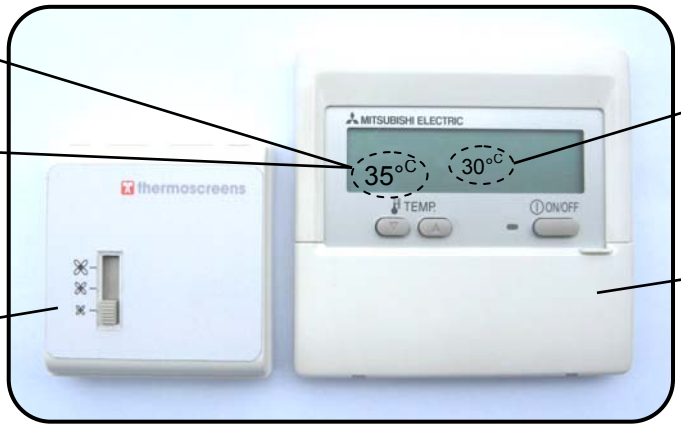
Ensure that all instructions and manuals are handed to the end user or their representative.

USER INSTRUCTIONS FOR THE AIR CURTAIN

For Weather Compensation Control (HEATING ECO mode)
or
Discharge Air Temperature Control (HEATING mode)

To Switch On and Off:

Turn the air curtain ON by pressing the ON/OFF Button on the PAR-W21MAA Remote Controller and the air curtain fans will start within a few seconds. If a 3-Speed Fan Switch is fitted adjust the fan speed to suit using the slider switch. As set up by the Commissioning Technician the air curtain will operate in HEATING ECO mode which is the energy saving Weather Compensation Control mode - all other buttons on the Remote Controller are locked out.


Target Temp calculated from heating curve – for HEATING ECO Mode (Weather Compensation Control)
or
Target Temp – for HEATING Mode (Discharge Air Temp Control)
3-Speed Fan Switch (if fitted) HIGH, MEDIUM, LOW
Air Curtain Discharge Air Temperature
PAR-W21MAA Remote Controller
MITSUBISHI ELECTRIC
35°C
30°C
TEMP.
ON/OFF
thermoscreens

Turn the air curtain OFF by pressing the ON/OFF Button on the PAR-W21MAA Remote Controller and the air curtain fans will stop within a few seconds. Do not turn off if **DEFROST** shows on the screen, wait until 3 minutes after defrost has finished.

If the PAR-W21MAA Remote Controller is not locked the following functions operate:- (hinge down front flap on remote controller)

HEATING ECO Mode (Weather Compensation Control):

Press the 'BACK' Button on the Remote Controller until HEATING ECO appears on the display. This is the energy saving Weather Compensation Control mode where the temperature of the discharge air coming from the air curtain automatically adjusts as the outdoor air temperature changes.

HEATING Mode (Discharge Air Temperature Control) if enabled:

Press the 'BACK' Button on the Remote Controller until HEATING appears on the display. Adjust the Target Temperature using the ▲ or ▼ TEMP. Buttons between 20°C and 40°C (maximum recommended). This is the Discharge Air Temperature Control mode of operation for the heat pump air curtain. Allow time for the air stream to heat up.

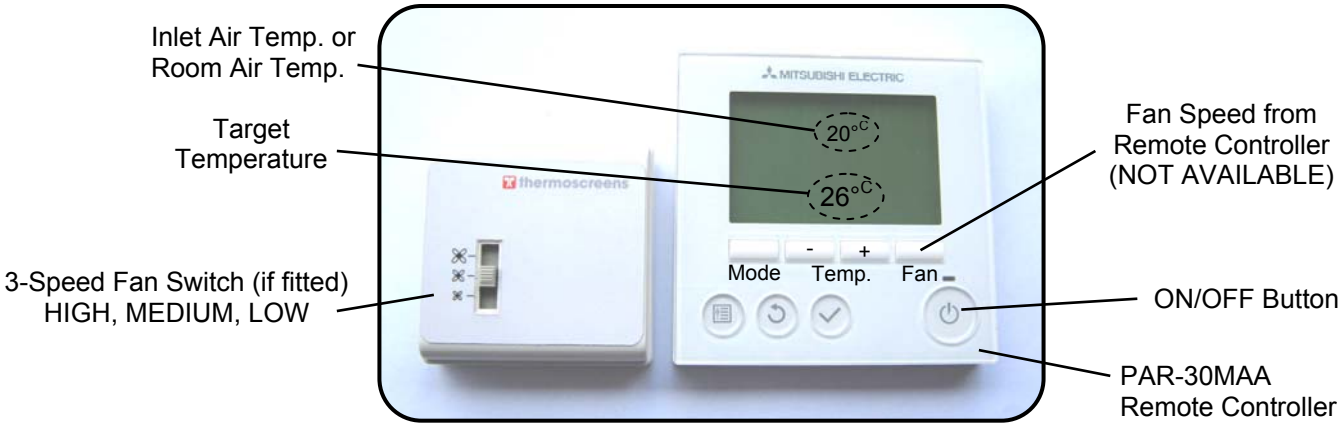
FAN only (ambient air curtain) – If using HEATING ECO mode the air curtain will automatically change to FAN only (airstream not heated) if the outdoor air temperature is above 15°C. If using HEATING Mode select the lowest possible target temperature of 20°C.

USER INSTRUCTIONS FOR THE AIR CURTAIN

For Inlet Air Temperature Control
or
Room Air Temperature Control

To Switch On and Off:

Turn the air curtain ON by pressing the ON/OFF Button on the PAR-30MAA Remote Controller and the air curtain fans will start within a few seconds. If a 3-Speed Fan Switch is fitted adjust the fan speed to suit using the slider switch. As set up by the Commissioning Technician the air curtain will operate in **Heat** mode, automatically heating as required, with a target temperature of 24°C - all other buttons on the Remote Controller are locked out.



Turn the air curtain OFF by pressing the ON/OFF Button on the PAR-30MAA Remote Controller and the air curtain fans will stop within a few seconds. Do not turn off if **DEFROST** shows on the screen, wait until 3 minutes after defrost has finished.

If the PAR-30MAA Remote Controller is not locked the following functions operate:-

HEAT Mode:

Press the Mode Button on the Remote Controller until **Heat** appears on the display. Adjust the target temperature using the **- or + Temp.** buttons between 22°C and 28°C maximum. This is the normal mode of operation for the heat pump air curtain and it should run in this set-up with no further adjustments, automatically heating as required. Allow time for the air stream to heat up.

FAN Mode (Fan only - no heating or cooling):

Press the Mode Button on the Remote Controller until **Fan** appears on the display.

COOL Mode: (only use if a condensate pump and drain system is fitted)

Press the Mode Button on the Remote Controller until **Cool** appears on the display. Adjust the target temperature using the **- or + Temp.** buttons between 24°C and 19°C (minimum recommended). Allow time for the air stream to cool. Do not necessarily use the lowest target temperature possible as this uses more energy and carbon resources.

SERVICING THE AIR CURTAIN

Vacuum Clean the Air Inlet Grilles / Filters

(Fortnightly, or when the Filter Dirty Indicator shows PERMANENT RED)

With the air curtain switched OFF, a vacuum cleaner with an extension tube and brush attachment at its end should be used to clean the face of the air inlet grilles. This is important to minimise the build-up of dust and lint on the air filters inside the inlet grilles which will affect the performance of the air curtain. This is a simple service task that can be carried out by the Cleaner or Janitor on a weekly basis from floor level without having to access the air curtain at high level. This should be done weekly as a regular service task and/or when the Filter Dirty Indicator shows permanent red.

ONLY if the Filter Dirty Indicator shows PERMANENT RED

Reset the Filter Dirty Indicator after cleaning by a quick press of the Reset Button.

NB.The filter dirty interval feature on the Mitsubishi Electric remote controller is not available.

Servicing the Air Curtain

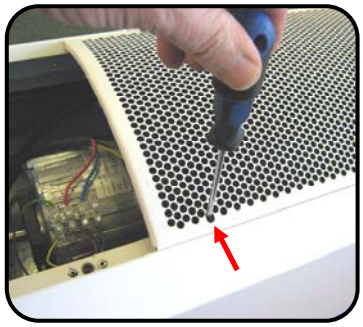
(suggest every 6 Months, or if the Filter Dirty Indicator shows FLASHING RED)

Before servicing, maintaining or repairing the Air Curtain always isolate the local electrical supply to the Air Curtain and the electrical supply to the Mitsubishi Electric Outdoor Unit.

Note: All servicing, maintenance and repairs to the air curtain must be carried out by an approved Service Agent. Keep any loose fixings for re-assembly.

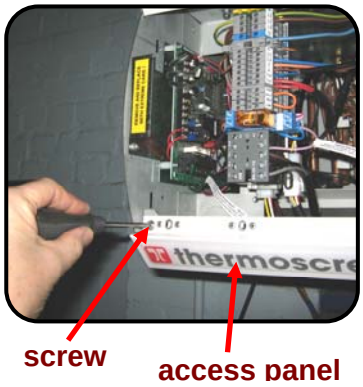
Remove the plastic end caps at each end of the unit by pulling off to the side as shown in the picture.

Remove each air inlet grille with its air filter by unfastening the quarter-turn Philips Head fastener at the bottom corner of the grille. Use a Philips No.1 screwdriver to access the screw via the elongated hole at the bottom corner of each grille and turn anti-clockwise to remove (see picture).



Remove the air filters from the air inlet grilles by gently prizing them free as shown. Gently vacuum clean and refit the filters into the curved air inlet grilles. The filters are durable but may need to be replaced after a number of service intervals.

To remove the bottom access panel unfasten the access panel securing screws, one at each end, plus two in the centre (HP1500 DXE and HP2000 DXE units) and slide the panel out forwards (see picture).

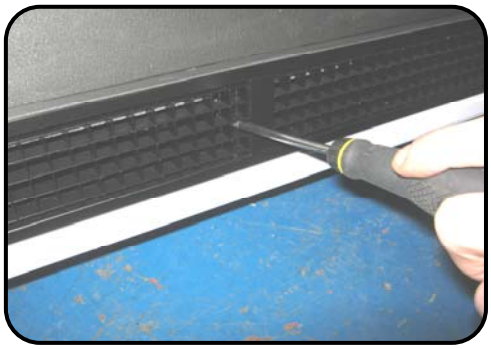


Vacuum clean and remove any build-up of dust, dirt and debris within the air-curtain, especially on the fans.

Note: Fan motors are permanently lubricated and require no additional lubrication.

If the Air Curtain has been used in Cooling:-

Remove two screws from each end of the air curtain that attach the air discharge grille assembly to the unit. Remove the discharge grille assembly from the unit.



On the HP1500DXE and HP2000DXE air curtains there is an additional screw at the middle of the grille that also needs to be removed.

Remove condensate hose from the drain tray outlet pipe, see picture.

Using a 10mm spanner loosen the two bolts, one at each end of the air discharge opening, by 2 turns. Do not remove these two bolts completely.

Remove the row of fixing screws along the whole length of the drain tray (see picture).

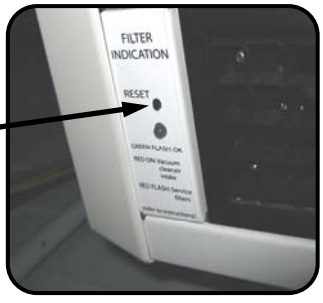
The drain tray now hinges down along its front edge and the inside surface of the tray can be cleaned. Remove all debris and deposits from the coil face, drain tray, outlet pipe, condensate hoses and the condensate disposal system.

Check there are no kinks in condensate hoses. If the condensate pump is a peristaltic type change the rubber pump head tube. Refit drain tray opposite to removal

Once the air curtain has been cleaned, visually inspect the air curtain components. Ensure pipe temperature sensors are located in their pockets and any foam insulation covering these pockets is un-damaged. Check that the thermal overheat cut-out switch (two on a HP2000DXE unit) has not tripped (see Section – Commissioning, Page 20). Check all electrical connections and terminals within the unit are tight and that crimp connections have not become loose.

Refit the bottom access panel and air inlet grilles with filters. Switch on the electrical supplies and fully function test the air curtain to ensure correct operation (see Section – Commissioning, Page 20).

Reset the Filter Dirty Indicator after the service by pressing the Reset Button for at least 5 seconds (even if the indicator has not gone flashing red) and hand back the unit to the end user.



Fault Finding

If the Thermoscreens Heat Pump Air Curtain System does not operate as expected refer to the fault finding table below:

Symptom	Possible Cause	Action Required
Air curtain fans do not operate	Electrical power is not switched on at the Mitsubishi Electric Outdoor Unit	Switch on power to Mitsubishi Electric Outdoor Unit and wait for system to boot-up
	Air curtain is not switched On	Switch on air curtain using the PAR-W21 or PAR-30 Remote Controller, BMS System or Centralised Controller
	Air Curtain fans are not wired to operate, no wire link on fan terminals in air curtain or a 3-Speed Fan Switch	Wire in the wire link or a 3-Speed Fan Switch – see Wiring Diagrams
	Problem with air curtain fan motor(s), internal wiring, controls or fan speed door switch if fitted	Use wiring diagram to investigate possible cause of fault
Air curtain discharge air stream is not heating or cooling when required	Air curtain has been running for less than 15 minutes and is still warming up or cooling down	Give system sufficient time to reach operating condition
	Weather Compensation Control: Outdoor air temperature is not cold enough for discharge air to be heated	This is normal and shows that air curtain is saving energy by working in Fan only mode
	Discharge Air temp Control, or Inlet Air Control or Room Air Control: Target temperature is set incorrectly, i.e. too low for heating or too high for cooling	Adjust the target temperature on the Remote Controller, BMS System or Centralised Controller
	The operating mode is set incorrectly, i.e. set on COOL when heating is required, or vice versa	Select the correct mode for the conditions on the Remote Controller, BMS System or Centralised Controller
	Air curtain will not COOL, if installation allows (must have condensate disposal system fitted)	Rectify condensate alarm circuit which must be open circuit for air curtain to operate in cooling. Also check plug is removed from CNX5 on PCB
	Air Curtain filters and/or coil is dirty.	Service air curtain as described in Section – Servicing, Pages 33 to 35
Mitsubishi Electric system is indicating an error code	Error Code indicating condensate alarm from condensate pump alarm system	Inspect air curtain condensate tray and condensate pump, service or repair if necessary
	A variety of error codes can occur because of a fault within the air curtain	Refer to Mitsubishi Electric Service Manual to understand fault, then inspect and repair air curtain if there is a fault

If the Heat Pump Air Curtain system is still not operating correctly call for a Mitsubishi Electric Service Agent.

Warranty

If any problems are encountered with the heat pump warm air curtain please contact your Mitsubishi Electric Service Agent.

Care has been taken in compiling these instructions to ensure they are correct, although Thermoscreens Ltd. disclaims all liability for damage resulting from any inaccuracies and/or deficiencies in this documentation. Thermoscreens Ltd. retain the right to change the specifications stated in these instructions.

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thermoscreens®

EC DECLARATION OF CONFORMITY

as defined by the EC Council Directive on Machinery 2006/42/EC, the Low Voltage Directive 2006/95/EC, Electromagnetic Compatibility Directive 2004/108/EC, the Pressure Equipment Directive 97/23/EC, the Energy related Products Directive 2009/125/EC

Herewith we declare that the air movement equipment designated below, on the basis of its design and construction in the form brought onto the market by us in accordance with the relevant safety, health and performance requirements of the Machinery.

If alterations are made to the machinery without prior consultations with us, this declaration becomes invalid.

Designation of Equipment :	THERMOSCREENS HEAT PUMP AIR CURTAINS used with a MITSUBISHI ELECTRIC MR SLIM HEAT PUMP SYSTEM
Series Type :	HP1000 DXE; HP1000R DXE; HP1500 DXE; HP1500R DXE; HP2000 DXE, HP2000R DXE
Relevant EC Council Directives :	the Machinery Directive (2006/42/EC) the Low Voltage Directive (2006/95/EC) the Electromagnetic Compatibility Directive (2004/108/EC) the Pressure Equipment Directive (97/23/EC) the Energy related Products Directive (2009/125/EC)
Applied Harmonised Standards :	Machinery - EN ISO 14121-1:2007, EN 294:1992, EN 414:2000 LVD - EN 60335-1:2002, +A14 incorporating A1, A2, A11, A12 & A13, EN 60335-2-30:2009, EN 60335-2-40:2003 EMC - EN 61000-6-1:2007, EN 61000-6-3:2007, EN 61000-3-2:2006 + A2:2009, EN 61000-3-3:2008 PED - EN 13133:2000, EN 13134:2000 ErP - ISO 5801:2007, ISO 12759:2010
Basis of Self Attestation :	Quality Assurance to BS EN ISO 9001 : 2008 B.S.I. Registered Firm Certificate Number FM 85224 SGS Test Report DUR 43908/2/R/RG/05; GL Test Report TR/09/149; Wemtech Test Report 6620
Responsible Person :	Mr. P.Casey, Site Managing Director, Thermoscreens Ltd.
Date :	1st January 2013
Signed :